

California Energy Commission



Workshop on Report to Governor: *“Evaluation of Biomass-to-Ethanol Fuel Potential in California”*

Sacramento, California

September 10, 1999



Today's Presentation

- Overview of state's phase-out of MTBE (Executive Order D-5-99)
- CEC's responsibility on ethanol portion
- Major preliminary report findings
- Key preliminary conclusions and recommendations
- Identification of areas requiring further study and analysis

Executive Order D-5-99



Governor Davis' Order determines:

- MTBE poses a threat to surface water, ground water, and drinking water
- MTBE may present potential health problems
- Reformulated gasoline can be produced without the use of MTBE

CEC Responsibilities under Executive Order



- Coordinate activities with four other state agencies for implementation
- Develop a timetable by July 1, 1999 for removal of MTBE from gasoline
- Work with CA Air Resources Board and petroleum industry to supply MTBE-free gasoline year round to Lake Tahoe area

Executive Order D-5-99

Potential For Ethanol



#11 of Executive Order states:

“CEC shall evaluate by December 31, 1999 and report to the Governor and the Secretary for Environmental Protection the potential for development of a California waste-based or other biomass ethanol industry. CEC shall evaluate what steps, if any, would be appropriate to foster waste-based or other biomass ethanol development in California should ethanol be found to be an acceptable substitute for MTBE.”

Peer Review Group



- Federal Government - Dept. of Energy and its National Labs
- State & Local Government - Integrated Waste Management Board, Dept. of Food and Agriculture, Air Resources Board, and County of Ventura
- Industry and Academic - Chevron, Environment and Energy Study Institute, MASADA, Pacific Rim Ethanol Corp. and University of Sherbrooke

Other Written Comments Received



Comments on August 13th draft received by:

Russ Miller - Arkenol

Don Kornreich - Board of Supervisors, Nevada Tahoe
Conservation District

Todd Sneller - Governors' Ethanol Coalition

Raphael Katzen - Raphael Katzen Associates
International, Inc.

James McElvaney - McElvaney Associates Corp.

Ethanol Report Schedule



■ Public Workshop	September 10
■ Draft Final Report	October 22
■ Public Hearing	November 19 (tentative)
■ Business Meeting	December 15
■ Report to Governor	December 31, 1999



Report Scope

- Evaluate waste biomass resources in California and possible benefits and challenges
- Assess energy crop potential in California
- Review biomass-to-ethanol conversion options
- Estimate biomass-to-ethanol production potential



Report Scope

- Examine the economics of biomass-to-ethanol production
- Identify issues that could affect development of a biomass ethanol industry
- List potential actions by California government and other entities that would aid the development of a viable industry



Key Preliminary Findings

- Virtually all of the ethanol produced in the US today is from Midwest corn and will continue to be for the near term (during MTBE phase out)
- Gross California waste biomass resources is about 50 million bone dry tons per year for potential ethanol feedstock
- About 40% of waste biomass from forest, 36% from MSW and 24% from agriculture
- At 70 gal/ton conversion rate, this theoretical limit of waste-derived ethanol is 3.5 billion gal/yr



Key Preliminary Findings

- The actual amount that is available, however, is significantly lower once economic, technological and institutional factors are considered
- If the three proposed California ethanol facilities are built 44 million gal/yr of ethanol could be produced by 2004 (or ~ 50 million including current production)
- Energy crops could produce even more ethanol over the long term, however, there are no known plans for utilizing energy crops for ethanol



Key Preliminary Findings

- Our analysis shows that ethanol will continue to require subsidies
- The outcome of the Feinstein bill and regulations on fuel specifications will impact the market for ethanol as a gasoline additive in California
- Additional markets for neat ethanol (e.g., E85) may emerge



Preliminary Key Findings

- Several process technologies appear to be economically comparable. The success of commercial deployment will depend on process improvements
- It is difficult to estimate biomass-derived ethanol production costs, but it is anticipated that costs will fall due to improved yields, reduced cost for feedstocks and enzymes, and addition of value-added co-products



Preliminary Key Findings

- In the long term, all the technologies using biomass residue can deliver ethanol at a price under \$1.00 per gallon when co-located with power production.
- Economic evaluation indicates that waste biomass-to ethanol technologies can produce ethanol at a cost competitive with corn derived ethanol from Midwest states



Key Preliminary Findings

- Significant environmental benefits can be realized from utilizing waste resources
- Considerable uncertainty exists due to lack of market experience and pending regulations
- Critical factors for biomass-to-ethanol industry are:
1) capital, 2) ability to obtain long term, low cost, clean feedstock



Challenges Facing Industry

- Relatively high production costs and capital requirements
- Difficulty in obtaining financing
- Uncertain motor fuel regulations
- Infrastructure, distribution and storage challenges

Challenges Facing Industry



- Lack of commercial scale experience with biomass-to-ethanol process technologies
- Local permitting and siting requirements
- Ability to obtain consistent, low cost feedstocks

Potential Benefits of Developing Industry



- Potential for reductions of greenhouse gas emissions
- Potential for improvement in forest health
- Diversion of waste materials from landfills
- Positive impact on rural economy

Potential Benefits of Developing Industry



- Improved air quality by reduction of open-field burning
- Domestically produced renewable fuel
- Non petroleum-based fuel source

Preliminary Conclusions and Recommendations



- Need clear, integrated biomass/ethanol state policy
- Should change the Integrated Waste Management Act to give full credit towards state waste diversion goals
- It may be appropriate for the State to fund first few facilities as a demonstration



List of Outstanding Areas

- More detailed information on three proposed California ethanol projects
- Expanded explanation of the MSW diversion credit
- Expand discussion of the potential relationship of biomass derived ethanol and greenhouse gas emissions



List of Outstanding Areas

- Provide additional information on food processing wastes and cull fruits
- Expand discussion of synthetically produced ethanol
- Add information on the potential to produce ethanol from livestock manure digested solids



List of Outstanding Areas

- Clarify the biomass conversion processes that apply to waste-based *and* energy crop feedstocks
- Inclusion of crop-based ethanol potential Expand discussion of existing network of biomass power plants
- Expand discussion of environmental and siting requirements of the types of ethanol projects foreseen in California, including nature and magnitude of such impacts

Its Now Your Turn...



We Look Forward to Your Comments